

**AMENDMENTS TO THE DRAWINGS:**

The attached replacement drawing sheet 1/1 includes changes to Figure 3. This sheet, which includes Figures 1-3, replaces the original drawing sheet 1/1, including Figures 1-3.

**REMARKS**

Favorable reconsideration is respectfully requested in view of the foregoing amendments and the following remarks.

Applicants are submitting the present Amendment without prejudice to the subsequent prosecution of claims to some or all of the subject matter which might be disclaimed by virtue of this paper (although none is believed to be), and explicitly reserve the right to pursue some or all of such subject matter, in Divisional or Continuation Applications.

**I. CLAIM STATUS AND AMENDMENTS**

Claims 1-10 were pending in this application when last examined and stand rejected.

Claims 1 and 6 are amended to incorporate the subject matter of claim 2 and to specify that the polymer actuator forms the cladding. Support can be found in the disclosure, for example, at page 3, second paragraph, page 7, second paragraph, and page 9, third paragraph.

Claim 3 is amended to depend on claim 1.

Other minor editorial revisions have been made to the claims to better conform to U.S. claim form. Such revisions are non-substantive and not intended to narrow the scope of protection. Such revisions include: amending claim 1 into "comprising" format to better conform to U.S. practice; replacing the "characterized by" language with "wherein"; and revising the

claim language to provide proper antecedent basis throughout the claims.

Claim 2 has been cancelled without prejudice or disclaimer thereto. Applicants reserve the right to file a continuation or divisional application on any cancelled subject matter.

Claims 1 and 3-10 are pending upon entry of this amendment.

No new matter has been added by the above claim amendments.

The specification is amended to include appropriate section headings to conform to U.S. practice. No new matter has been added.

A replacement drawing sheet 1/1 is attached herewith to replace original drawing sheet 1/1. Fig. 3 has been revised to include reference 26 as supported by the disclosure at page, 10, lines 4-6. No new matter has been added.

## **II. OBJECTIONS TO THE DRAWINGS AND SPECIFICATION**

The drawings were objected for not including a reference 26 for the reason in item 1 on page 2 of the Office Action.

As noted above, a replacement drawing sheet 1/1 is attached herewith to replace original drawing sheet 1/1. In the replacement sheet, Fig. 3 has been revised to include reference

26 as supported by the disclosure at page, 10, lines 4-6. Thus, the present amendment overcomes this objection as to the drawings.

The specification was also objected for not containing appropriate section headings for the reasons in item 1 on pages 2-3 of the Action. The present amendment overcomes this concern by amending the specification, where appropriate, to include section headings and to conform to U.S. practice.

Thus, withdrawal of the above objections is solicited.

### **III. OBVIOUSNESS REJECTIONS**

Claims 1-3, 5, 6, 8, and 9 were rejected under 35 U.S.C. § 103(a) as obvious over LARDIERE et al. (U.S. 4,982,121) in view of PEI et al. (U.S. 2004/0263028) for the reasons in items 3-10 on pages 3-5 of the Office Action.

Claim 4 was rejected under 35 U.S.C. § 103(a) as obvious over PEI et al. in view of ZALALUTDINOV et al. (U.S. 2006/0239635) for the reasons in items 11-12 on page 6 of the Office Action.

Claims 7 and 10 were rejected under 35 U.S.C. § 103(a) as obvious over PEI et al. in view of KIHARA et al. (U.S. 2002/0043901) for the reasons in items 13-15 on pages 6-7 of the Action.

These rejections are respectfully traversed and will be discussed together below.

It is well established that a rationale to support a conclusion that a claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions. Obviousness also requires a reasonable expectation of success, which means that the combination of cited references would have yielded nothing more than predictable results to one of ordinary skill in the art. See, *KSR International Co. v. Teleflex Inc.*, 550 U.S. \_\_\_, \_\_\_, 82 U.S.P.Q.2d 1385, 1395 (2007); and M.P.E.P. (Eighth Ed., Rev. 6 (September 2007) at § 2143.02.

In the instant case, independent claims 1 and 6 have been amended to specify "a polymer actuator in the form of a membrane actuator which forms the cladding for the deformation of the boundary layer". It is noted that the polymer actuator forms the cladding as discussed in the disclosure, for example, at page 3, second paragraph, page 7, second paragraph, and page 9, third paragraph. Also, the last clause of amended claim 1 states: "wherein the cladding bears on a substrate by means of a bearing area which matches the surface area of the cladding in terms of magnitude, with only subregions of the bearing area being fixed to the substrate." Amended claim 6 has a similar requirement.

Applicants respectfully submit that the cited prior art references fail to disclose or suggest these features of amended independent claims 1 and 6.

In item 4 on page 3 of the Action, the Office relied upon LARDIERE et al. as disclosing that the cladding, according to Figs. 5 and 6 of LARDIERE et al., would consist only from positions 26, 34, 28 and 36. Only this view would allow one to come to the conclusion that the cladding would be fixed only on subregions of the boundary layer provided by 31. However, Applicants respectfully disagree with this characterization of LARDIERE et al. and submit that it is inaccurate.

Instead, the hatch in the elastic structure of Figs. 5 and 6 is evidence that also 21 is part of the cladding, which consists only from one part which also includes layers 13, 29, 31, and 14. So the surface to be cladded is provided by the substrate S. See, in LARDIERE et al., the specification, column 5, line 56, where 26 and 27 are called "first out wall" and "second outer wall", and S is called the "surface." It is respectfully submitted that this structural arrangement is different from and does not suggest that of the cladding of amended claims 1 and 6.

As specified in amended independent claims 1 and 6 of the instant application, the cladding shell is fixed only in subregions of the substrate surface. See, for instance,

the last lines of amended claim 1. The specification of LARDIERE et al. specifies that the cladding (outer wall 27) abuts the surface S. However, after careful examination of Fig. 6 of LARDIERE et al., it is clear to one of ordinary skill in the art that the outer wall 27 must be fixed on the surface S in the whole area. Otherwise, due to the elastic behavior of 27, a deformation would occur as can be seen in the attached sketch 6(A). It is respectfully submitted that this structural arrangement is different from and does not suggest that of amended claims 1 and 6, in which the cladding shell is formed only in subregions of the substrate surface.

Further, even if PEI et al. were combined with LARDIERE et al., it would not result in the cladding of amended claims 1 and 6. In this regard, LARDIERE et al. only would disclose use of a substrate in which the cladding bears on the substrate by means of a bearing which does not match the surface area of the cladding, so that only subregions of the bearing area are fixed to the substrate. However, this would lead to an embodiment as shown in the attached sketch 6B. It is respectfully submitted that this structural arrangement is different from and does not suggest that of the cladding of amended claim 1.

Further, another possible reading, would be to change the polymer actuator of LARDIERE et al. with the actuator of Fig. 1E of PEI et al. This would lead to an

embodiment as shown in the attached sketch 6C. This structural arrangement is also different from and does not suggest the cladding of amended claim 1. This line of reasoning also applies for amended independent claim 6. The combination of LARDIERE et al. and PEI et al. only would result in the embodiment shown in attached sketch 6C. This is because the functional principles of the claddings of LARDIERE et al. and PEI et al. work in such a way that an activation of the electrodes causes a warping of the polymer layers. This means that the thickness of the polymer layers remains more or less constant.

By contrast, the cladding of amended claim 6 works by utilizing another functional principle. As can be seen in Fig. 3, the polymer layer 15, in case of activation of the electrode-network, 16a gets areas with decreased thickness and areas with increased thickness, because the material of the polymer layer is displaced when the electrode-network is activated by the substrate electrode 12. There is simply no suggestion or discussion of such structure and function in LARDIERE et al. and PEI et al.

For these reasons, it is respectfully submitted that LARDIERE et al. or PEI et al., taken alone or when combined, fail to disclose or suggest each and every element of the cladding of amended claims 1 and 6. Thus, claims 1 and 6 are



novel and patentable over the combined teachings of LARDIERE et al. and PEI et al.

The remaining secondary references of ZALALUTDINOV et al. and KIHARA et al. fail to remedy the above-noted deficiencies of LARDIERE et al. or PEI et al. ZALALUTDINOV et al. was relied upon as disclosing a piezoelectric element in which a through-hole is provided in the cladding. Similarly, KIHARA et al. was relied upon as disclosing a piezoelectric element in which the electrode is in the form of honey-comb-like web structures. Yet, neither reference discusses the above-discussed features missing from the primary references.

For these reasons, it is respectfully submitted that LARDIERE et al., PEI et al., ZALALUTDINOV et al. or KIHARA et al., taken alone or when combined, fail to disclose or suggest each and every element of the cladding of amended claims 1 and 6. Thus, independent claims 1 and 6 are novel and patentable over the combined teachings of LARDIERE et al., PEI et al., ZALALUTDINOV et al. and KIHARA et al.

Claims 3-5 and 7-10 depend, either directly or indirectly, on claims 1 and 6. Accordingly, these dependent claims are also novel and patentable over the combined teachings of LARDIERE et al. and PEI et al. for the same reasons, in view of their dependency on claims 1 and 6.

Therefore, the above-noted obviousness rejections are untenable and should be withdrawn.

**V. CONCLUSION**

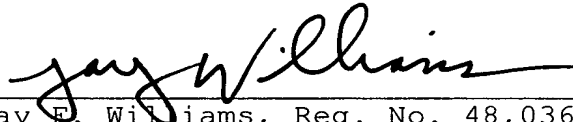
In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance and early notice to that effect is hereby requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact the undersigned attorney at the telephone number below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON



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Jay E. Williams, Reg. No. 48,036  
209 Madison Street, Suite 500  
Alexandria, VA 22314  
Telephone (703) 521-2297  
Telefax (703) 685-0573  
(703) 979-4709

JW/mjr

**APPENDIX:**

The Appendix includes the following item(s):

- ☒ - drawing Replacement Sheet 1/1
- ☒ - attached sketches 6(A), 6(B) and 6(C).